Physical and mechanical control of *Crassula helmsii* and *Ludwigia peploides*.

Is it a realistic option?

Johan van Valkenburg, INBO & Natuurmonumenten

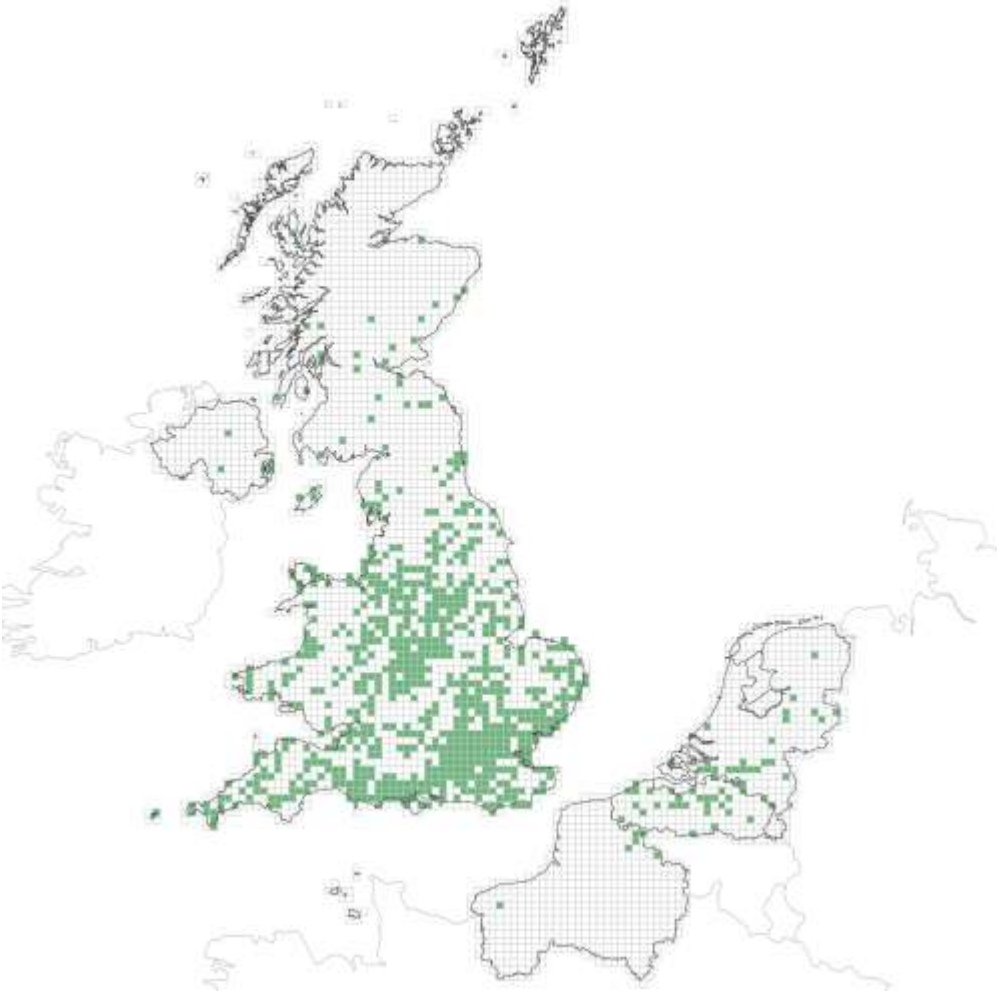
Norwich, October 17th 2013

Reducing the Impact of
Non-native Species in Europe
www.rinse-europe.eu

"Investing in your future"
Crossborder cooperation programme 2007-2013 Part-financed by the European Union (European Regional Development Fund)

Crassula helmsii

- Truly amphibic,
- Often overlooked
- Low nutrient levels (tolerance)
- Well established in UK
- Increasing fast in NL, B (and FR?)



Ludwigia grandiflora & Ludwigia peploides

- Both species posing the same problem, often misidentified
- High nutrient levels
- Recent arrival in UK (*L. grandiflora*)
- Well established NL, B & FR (*L. grandiflora*)
- Very limited NL, B, FR (*L. peploides*)

Activities in NL prior to RINSE

Activities in NL prior to RINSE
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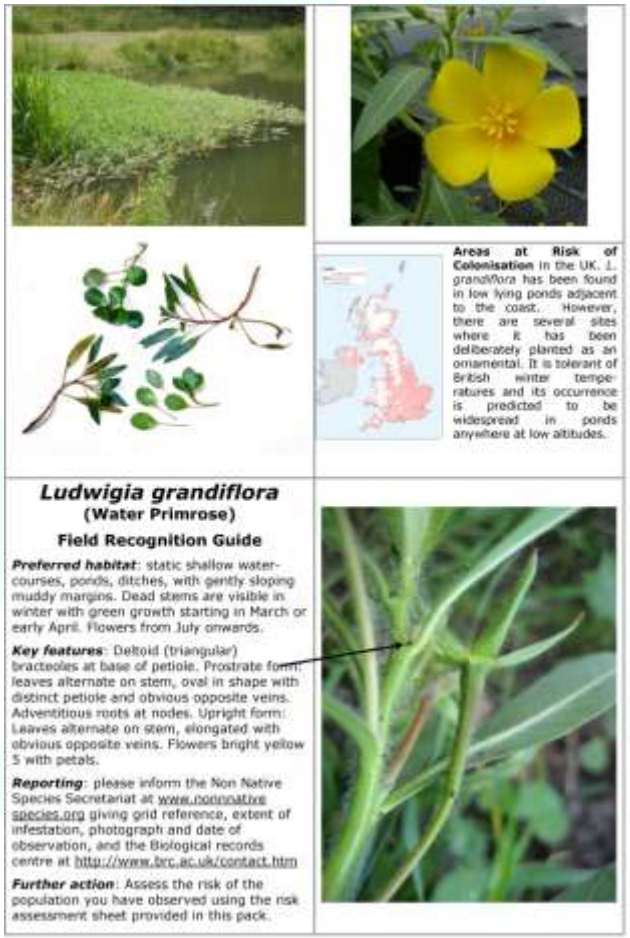


Areas at Risk of Colonisation in the UK. *L. grandiflora* has been found in low lying ponds adjacent to the coast. However, there are several sites where it has been deliberately planted as an ornamental. It is tolerant of British winter temperatures and its occurrence is predicted to be widespread in ponds anywhere at low altitudes.

Ludwigia grandiflora
(Water Primrose)

Field Recognition Guide

Preferred habitat: static shallow water-courses, ponds, ditches, with gently sloping muddy margins. Dead stems are visible in winter with green growth starting in March or early April. Flowers from July onwards.

Key features: Deltoid (triangular) bracteoles at base of petiole. Prostrate form: leaves alternate on stem, oval in shape with distinct petiole and obvious opposite veins. Adventitious roots at nodes. Upright form: Leaves alternate on stem, elongated with obvious opposite veins. Flowers bright yellow 5 with petals.

Reporting: please inform the Non Native Species Secretariat at www.nonnativespecies.org giving grid reference, extent of infestation, photograph and date of observation, and the Biological records centre at http://www.brc.ac.uk/contact.htm

Further action: Assess the risk of the population you have observed using the risk assessment sheet provided in this pack.

Ludwigia grandiflora (Michx.) Greuter & Burdet

A guide to Identification, Risk Assessment and Management

© S. Hathaway

Plant Protection Service, Wageningen, NL
Centre for Ecology and Hydrology - Wallingford, UK

June 2011

Field guide invavise aquatics NL / INVEXO project

Target species of management trials

- *Hydrocotyle ranunculoides*
- *Myriophyllum aquaticum*
- *Ludwigia grandiflora*

Crassula helmsii part of communication project as such

Information on Q-bank fact sheets

Identification / espèces similaires : Les stipules de la Jussie fausse-péplide sont rondes à ovales et gonflées, alors que celles de la Jussie à grandes fleurs sont triangulaires, étroites et plates. De plus, les anthères de la Jussie faussepéplide mesurent 1 à 1,8 mm et celles de la Jussie à grandes fleurs 2 à 3 mm.

Identification / similar species : Australian swamp stonecrop is similar to pearlwort (*Sagina* spp.) and water-starwort (*Callitriche* spp.). The stem of this plant is usually white to red and the flower has 4 corolla leaves (pearlwort 5, rarely 4; water-starwort with tiny flowers without corolla leaves).

Ludwigia a brief history for NL

- First record *L. grandiflora* as invasive 2000

- First record *L. peploides* as invasive 2007

→ approval for eradication action in nature restoration project

Verification November 2007

Verification November 2007

Verification November 2007

Eradication November 2007

Mangement advice

- Topsoil removal to a depth of 10 – 30 cm

and contaminated soil to be stockpiled

- Emergent creeping vegetation marked and the soil excavated to a depth of 30 cm
- Drainage of ditches prior to excavation
- Holes to be dug at the site in areas where no *L.peploides* is present, and contaminated topsoil with fragments and plants to be buried at least 1 m deep.
- Reprofiling ditches and margins after removal

Eradication November 2007

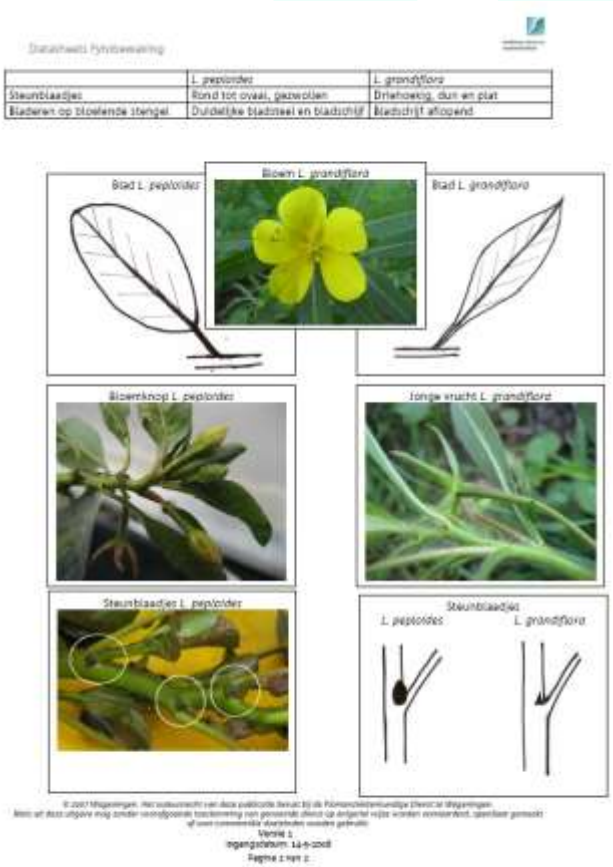
Eradication November 2007

Eradication November 2007

Eradication November 2007

Eradication November 2007

Follow-up Biesbosch 2008-2009



	L. peploides	L. grandiflora
Steunblaadjes	Rond tot ovaal, gezwollen	Driehoekig, dun en plat
Bladeren op bloeiende stengel	Duidelijke bladsteel en bladschijf	Bladschijf afloopend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Overzicht Tiengemeten
Tiengemeten
Over dit natuurgebied
Beleef Tiengemeten
NIEUWS
Bestrijding kleine waterteunisbloem op Tiengemeten
02 okt 2012, 14:50
Op Tiengemeten is de kleine waterteunisbloem (Ludwiga peploides) aangetroffen. Deze soort komt van nature niet in Nederland voor, kan zich explosief ontwikkelen en kan een bedreiging vormen voor inheemse soorten. Daarom neemt Natuurmonumenten maatregelen om verdere verspreiding van deze invasieve soort te voorkomen.
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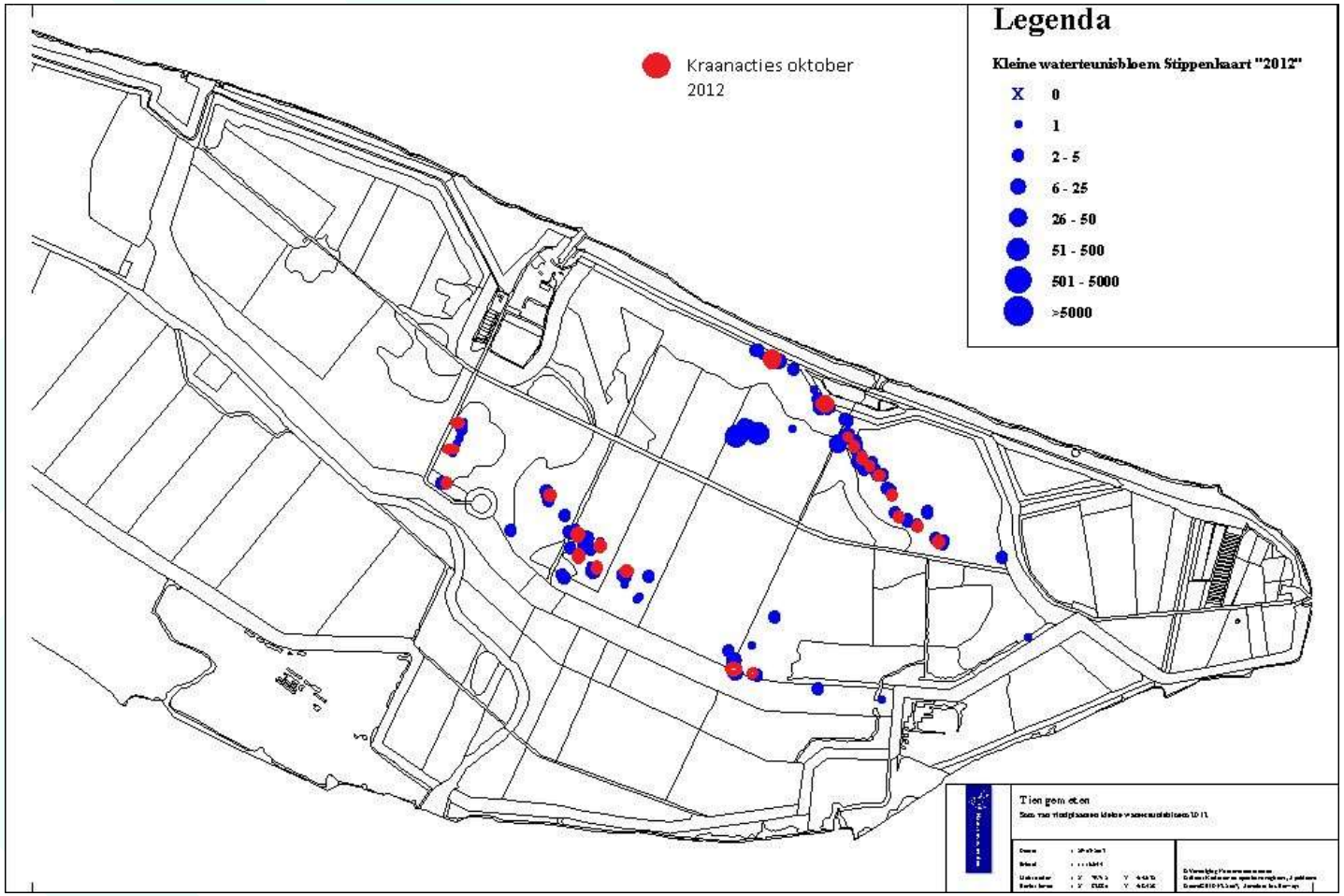
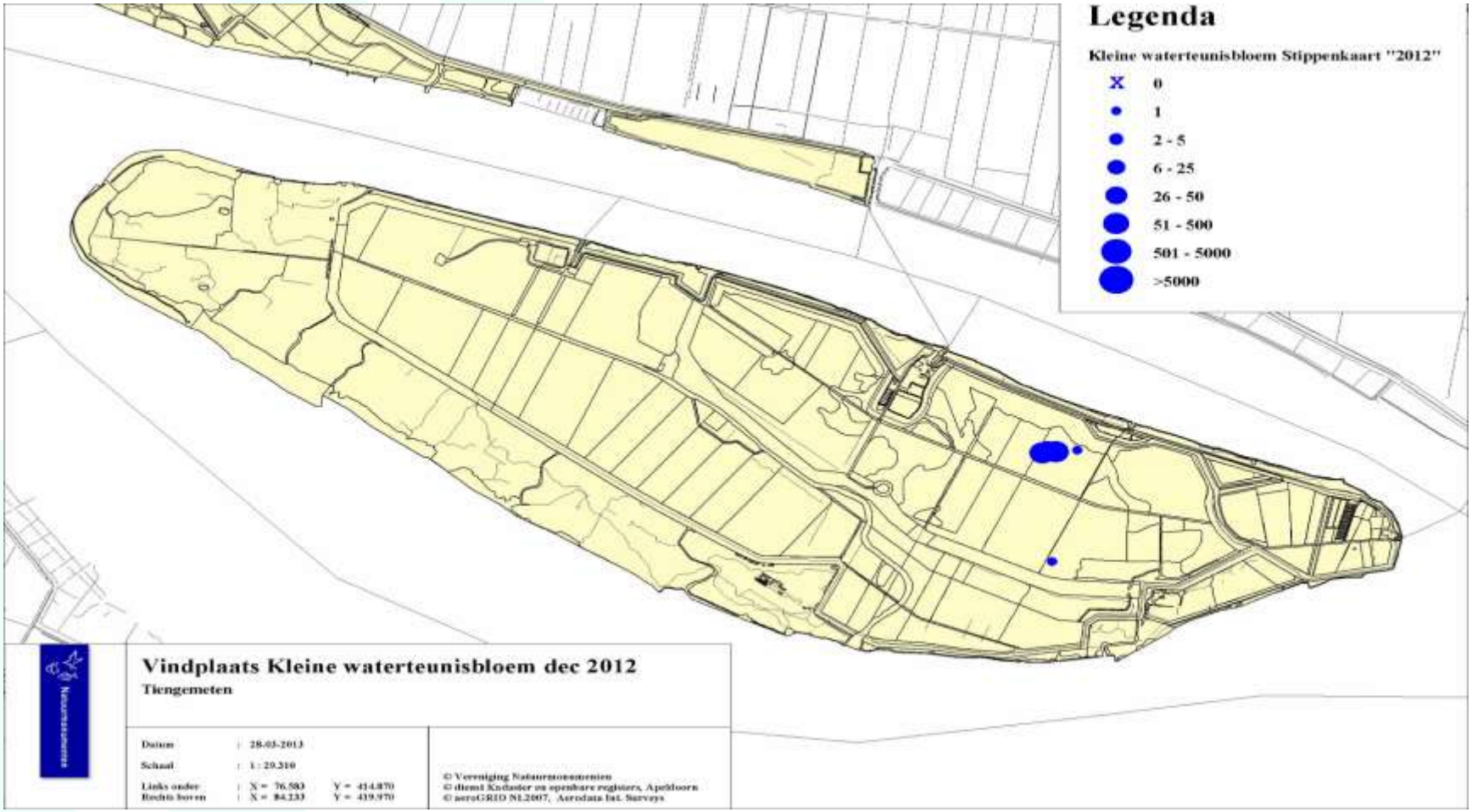
Distribution 2012



Tiengemeten 2012
nature restoration project

December 2012 survey



Mechanical and manual actions 2013

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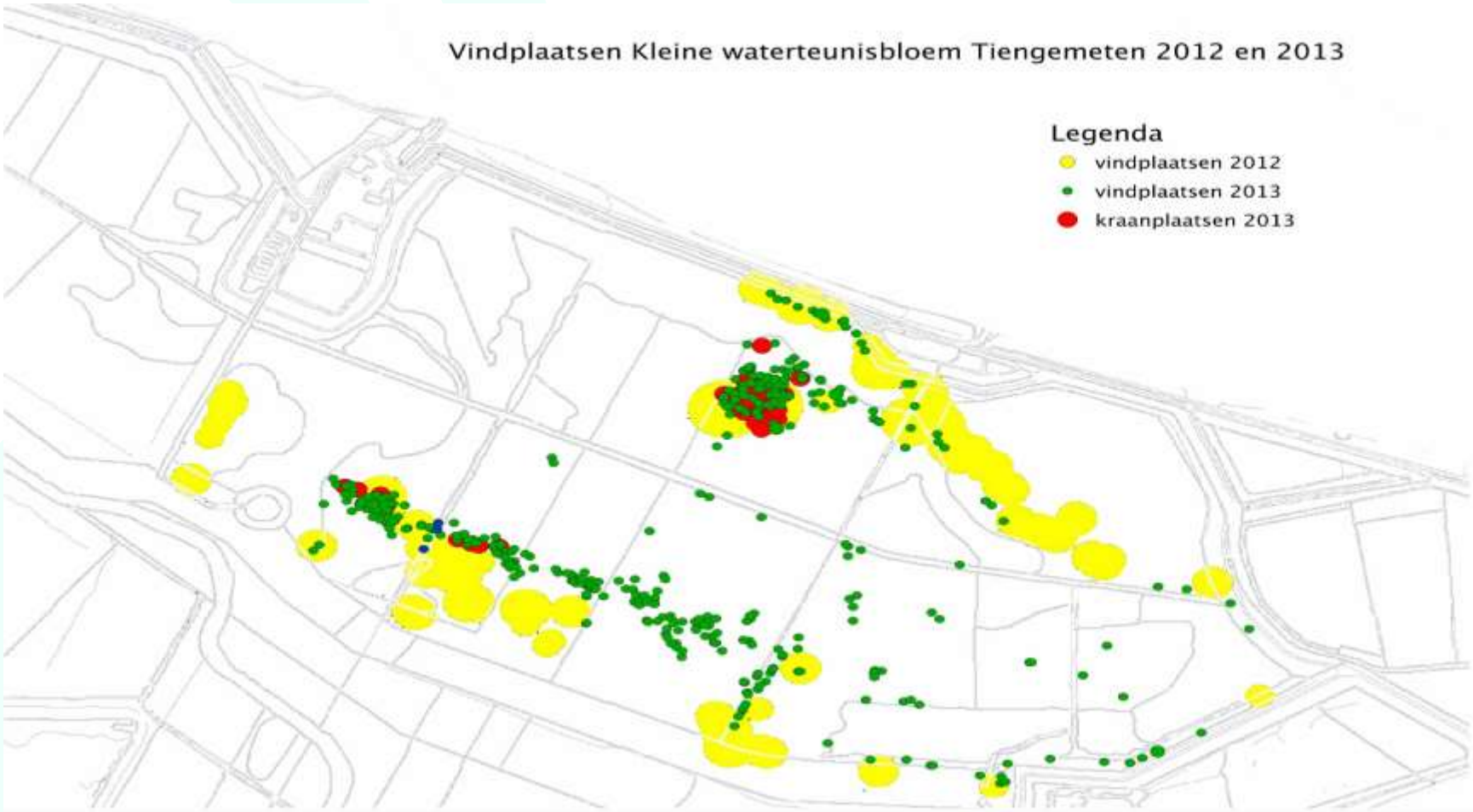
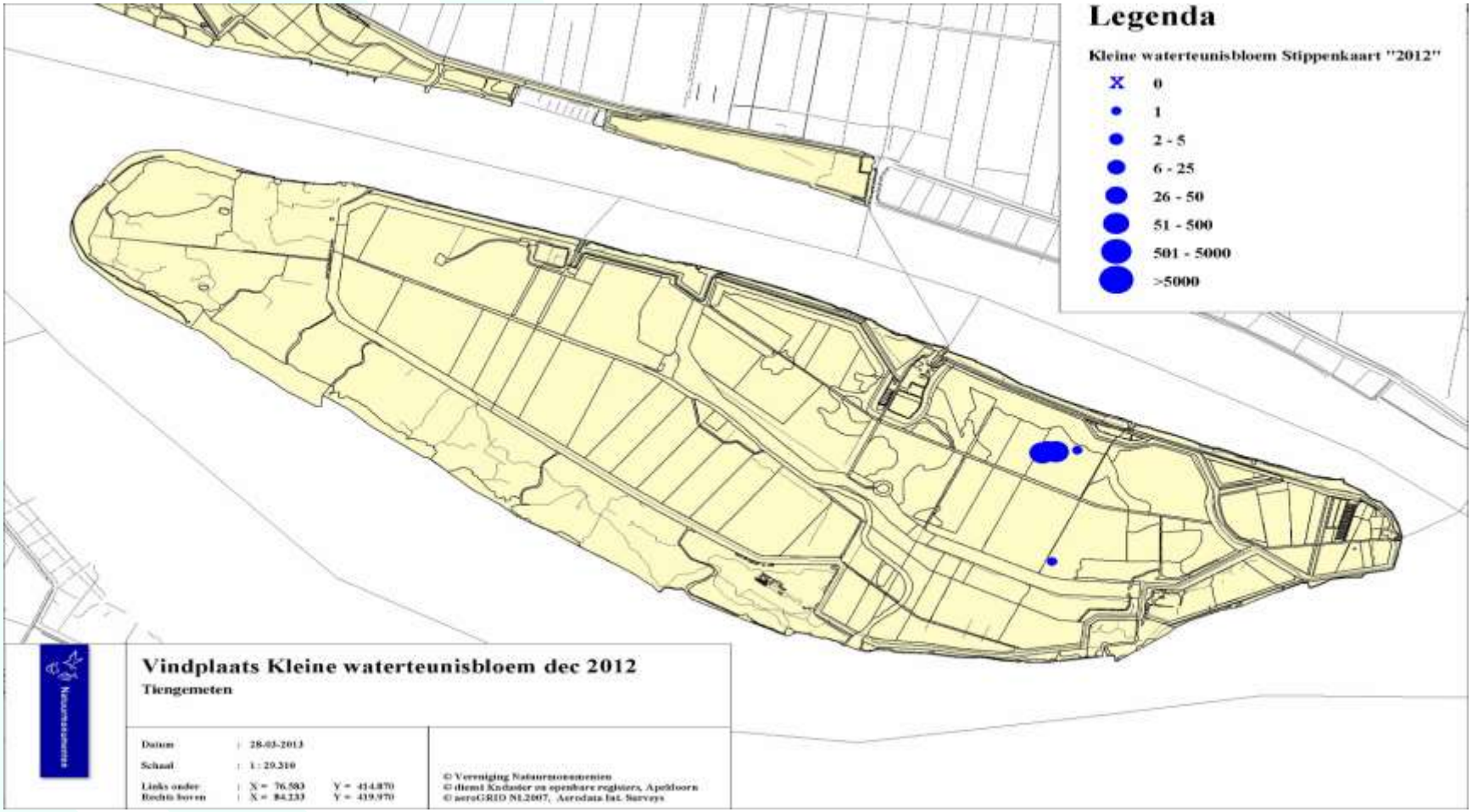
Facilitators of establishment

Results 2013 survey
regrowth treated sites and new infestations



December 2012 survey



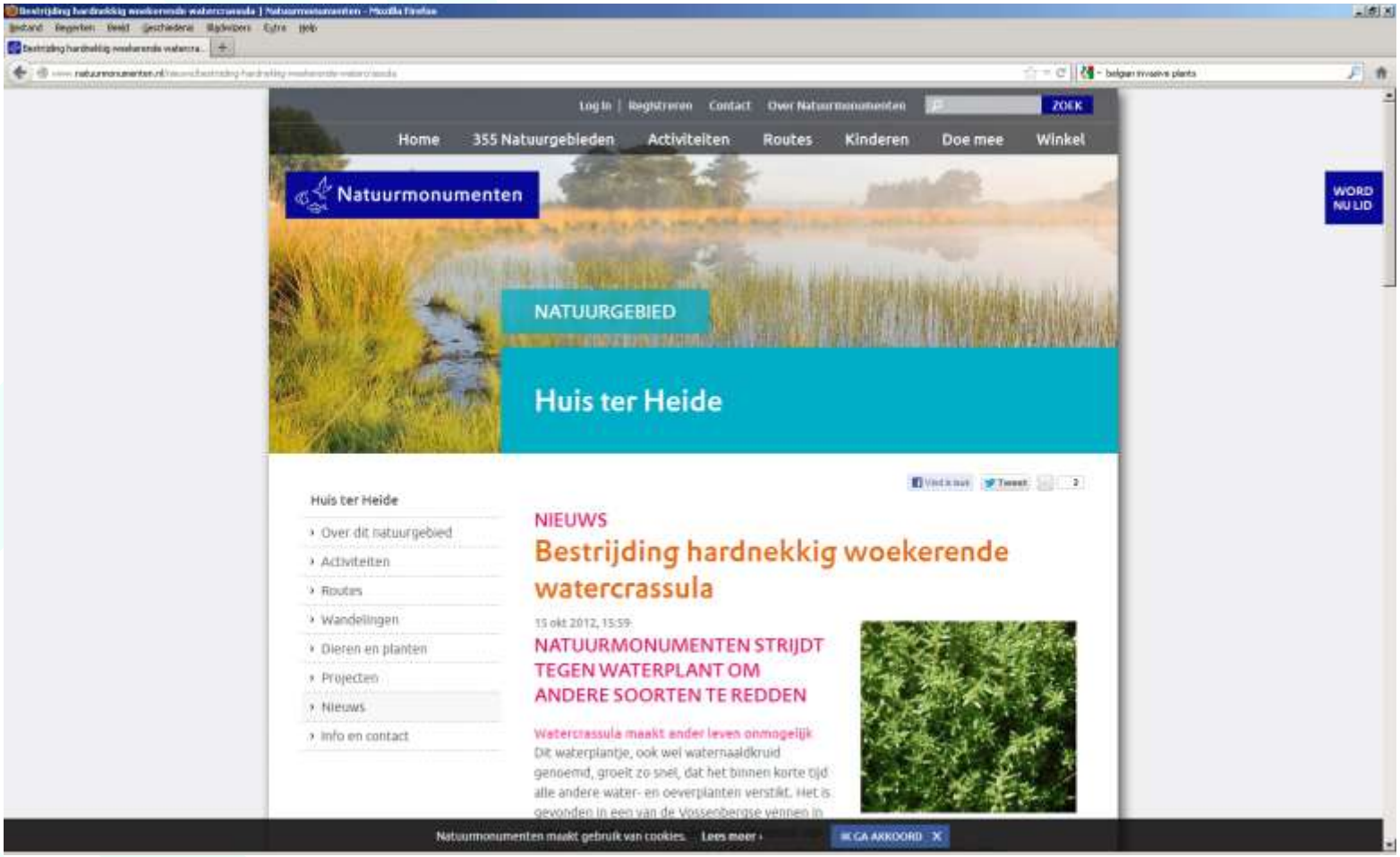
Financial aspects of actions

	2012	2013
Excavator	**€ 3.400**	**€ 1.700**
Amphibic excavator		**€ 9.400**
Materials		**€ 300**
Employees	**160 hours**	**252 hours**
Volunteers	**60 hours**	**414 hours**

Crassula a brief history for NL

- First record in 1995
- Reluctance to act in the absence of impact on drainage systems
- Gradual acknowledgement as a problem for nature restoration projects, dune valleys also susceptible.
- Increasing presence in ponds for conservation of amphibians

First involvement Noordenveld nature restoration project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Bestrijding hardnekkig woekerende watercrassula
15 okt 2012, 15:59
NATUURMONUMENTEN STRIJDT TEGEN WATERPLANT OM ANDERE SOORTEN TE REDDEN
Watercrassula maakt ander leven onmogelijk
Dit waterplantje, ook wel waternaaldkruid genoemd, groeit zo snel, dat het binnen korte tijd alle andere water- en oeverplanten verstikt. Het is gevonden in een van de Vosseenbergse vennen in
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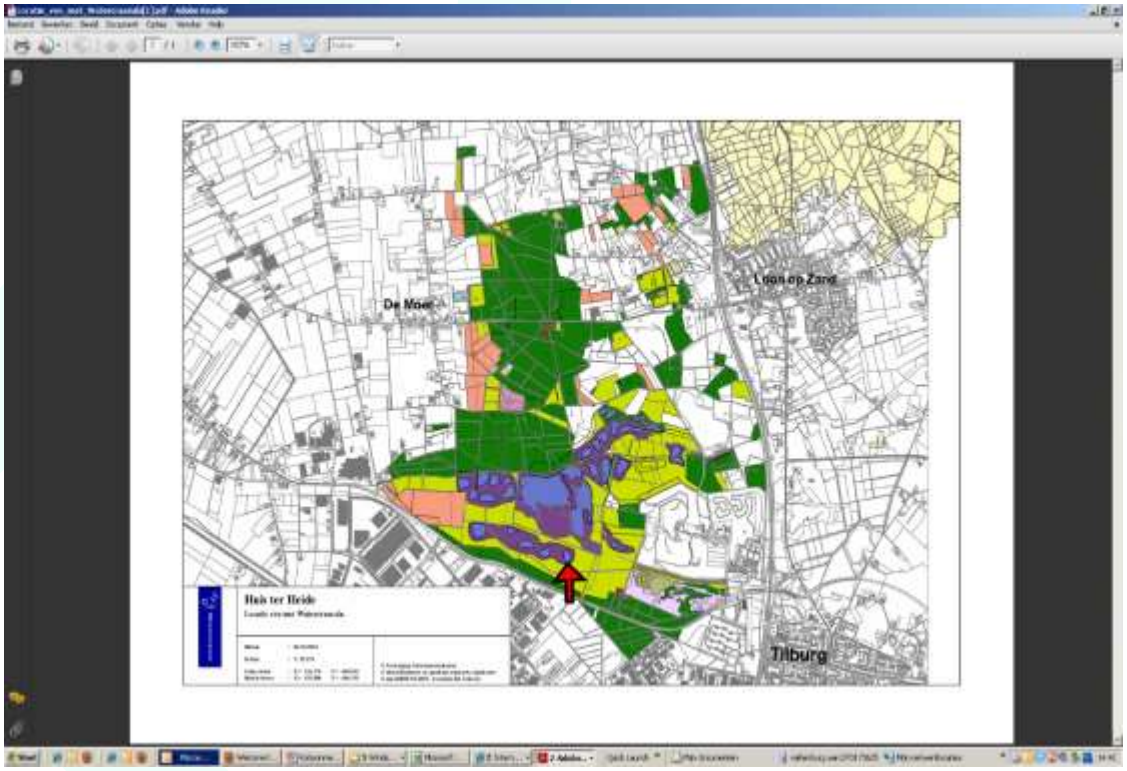
Crassula helmsii at Huis ter Heide

- June 2012 request for management advice by Erwin de Hoop



Site visit June 2012

Site visit June 2012

Observations June 2012

- Scattered plants on dry land
- Varying levels of infestation on the periodically flooded pools
- Massive infestations on the bank of the large pond
- Probably present at greater depth
- All infestations at some time of the year connected with the large pond

Advice based on visit June

- Containment of the infestation
- Exclude grazers from the site
- Start draining the pond
- Remove topsoil upper 20 cm
- Burry contaminated soil on site

July 2012 pump at full swing

July 2012 effect of drainage

Status activities end of July 2012

- After weeks of pumping minimal achievable depth has been reached due to pressure from groundwater
- At centre of pond still 50 cm depth
- Start of removal of 20 cm topsoil on drained pond and dry land areas

Visit August 2012

- Topsoil removed of exposed pond bottom
- Water level rising
- Topsoil removed from originally delimited areas
- Additional surveys initiated

Visit August 2012

Status of the project August 2012

- 3400 cubic meters of soil removed
- Still 1200 cubic meters to go
- Remnant population at the bottom of the lake is a permanent source of propagules
- Application of dye becomes an option to consider

October 2012

- Volunteers involved in survey of all new ponds
- Administrative search to obtain permission for application of dye initiated
- New sightings at 2 additional ponds
- INBO on board to monitor vegetation development

Visit October 9 2012

Visit October 9 2012

Recommendations & follow up

- Bare banks of the pond to be covered in ‘plastic’
- Monitoring plots to be established
- New infestations to be signalled and removed or isolated
- Surveying fragments that wash ashore

Oktober - November 2012

Financial aspects of actions

Some figures so far (December 2012)

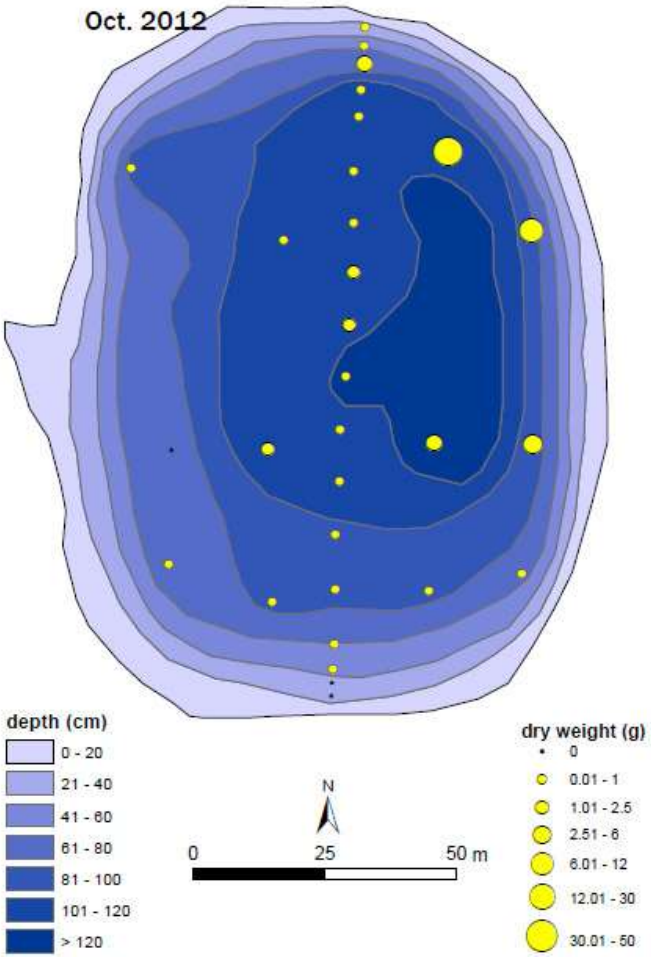
• Draining, scraping, burying	€ 55.000
• 1500 m of fabric (4 m wide)	€ 5.500
• 750 m of fencing material	€ 1.500
• Staff time Natuurmonumenten & volunteers (877 hours)	€ 21.000
• Dye (30 kg)	€ 600
• Staff time INBO	p.m.
• Staff time NVWA	p.m.

January 2013

- Water level rising above initial covered surface
- Fragmenst washing ashore
- Volunteers cleaning shores every week

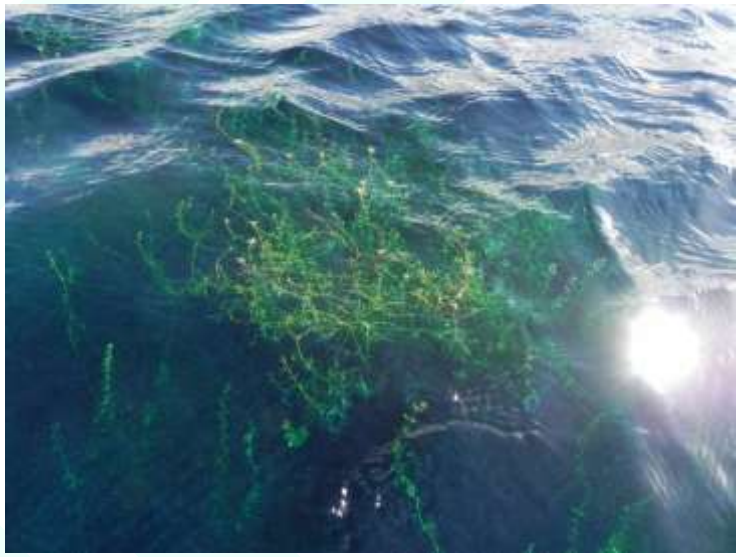
Application of dye 2013

- First application January 16 kg
- Pond c. 150 m across
- Central part 150 cm deep

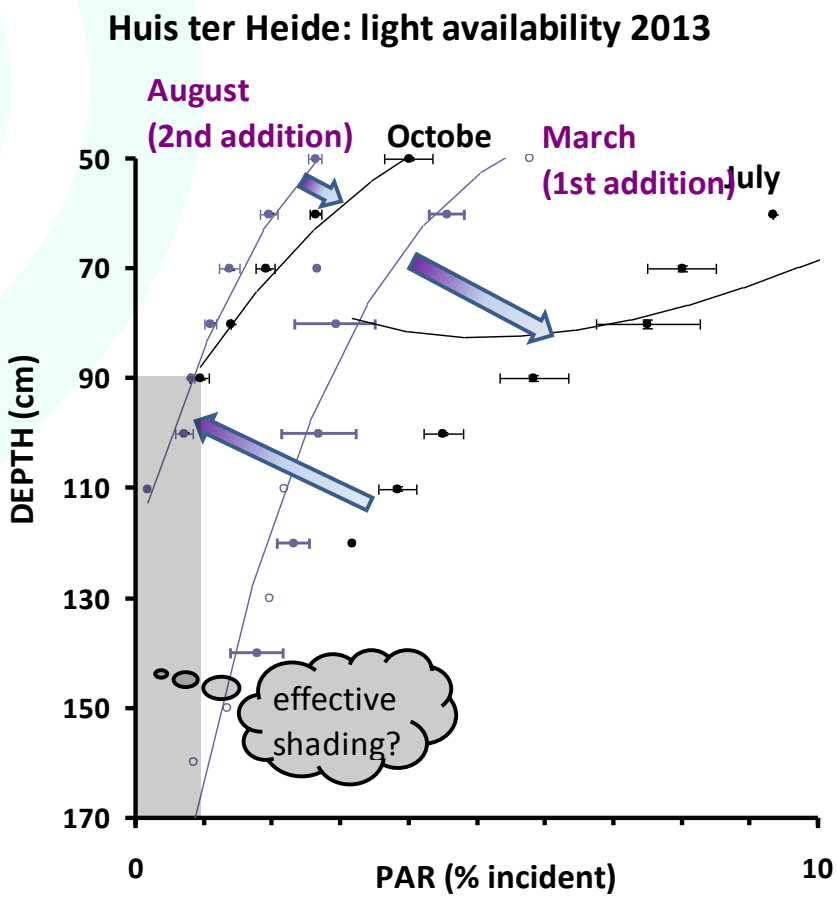


Application of dye 2013

- Topping up March 14 kg
- 2nd load 30 kg August



State-of-the-art autumn 2013



Volunteer actions 2nd & 3rd pond

October surprises

Financial aspects of actions 2013

- Costs of dye € 1200
- Volunteers 482 days
- Staff time 95 days
- Staff NVWA p.m.
- Staff INBO p.m.

- Natuurmonumenten >4600 hours

Every method tested

Is it feasible?

Ludwigia peploides:

- Yes with stamina and preferably at an early stage of infestation (2nd year)

Crassula helmsii:

- Only with extreme sanitary measures in dry land areas
- Scale dependant
- In amphibic situations highly problematic
- Prepare for a serious battle (if you see a little there is far more!!
- Management guidance document in preparation

Special thanks to:

- Astrid Withagen, Esther Dijkstra, Menno van Zuijen (Natuurmonumenten – Beheereenheid Haringvliet / Krammer Volkerak) & all volunteers

- Erwin de Hoop, Donald van Hoek, Gerard van den Burg (Natuurmonumenten – Midden Brabant) & all volunteers

- Tim Adriaens, Jo Packet, Wouter Van Landuyt, Lon Lommaert, Sander Devischer, Kris Decleer, Bart Vandevoorde (INBO)